

## Original Research Article

# Utilization of iron folic acid tablets among pregnant women in rural Punjab: an interventional study

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## ABSTRACT

**Background:** Anemia in pregnancy remains a public health problem and is an important indirect cause of maternal mortality accounting for 20% of total maternal deaths in India. However, it is largely preventable and easily treatable. Since, decades, the Government of India has recommended iron folic acid (IFA) supplementation as prophylaxis but adherence to IFA tablets is invariably poor. Health education of antenatal women can be an effective tool for improvement in IFA consumption and compliance. Thus, this study was conducted to assess the problem of anemia and its epidemiological determinants among pregnant women in rural field practice area of Punjab as well as to evaluate the compliance and utilization of IFA tablets before and after the health education intervention.

**Methods:** Author filled in the predesigned and pretested proforma and imparted health education to all the pregnant women who were then followed. Hb was estimated on two different occasions, before and after the intervention.

**Results:** After intervention, 82.88% of pregnant women took IFA tablets out of which 42.31% consumed more than 90 tablets. Factors like education, socio-economic status, type of family and gravidity were found to be significantly associated with anemia. Although the overall prevalence of anemia reduced slightly from 96.4% to 92.67% after intervention, the mean Hb levels got decreased.

**Conclusions:** Despite interventions, the desired outcomes were not obtained. Constant motivation of antenatal women by health workers and IEC activities in the community are thus recommended to improve the IFA compliance rates and combat anemia.

**Keywords:** Anemia, Health education, Hemoglobin, IFA, Intervention

## INTRODUCTION

Nutritional iron deficiency is one of the most rampant nutritional deficiency disorders, affecting more than 2 billion people across the globe. The prevalence of iron deficiency anemia in pregnant women is about 17.4% in industrialized countries whereas in underdeveloped countries, it becomes as high as 60%. Most of the pregnant women were already suffering from anemia antecedent to conception.<sup>1</sup>

Iron deficiency as well as iron deficiency anemia during pregnancy may result in incremental risks of developing preeclampsia, delayed fetal maturation, low birth weight, prematurity, perinatal mortality and irreversible compromise to infants' neurocognitive development and motor capacity.<sup>2</sup>

Anemia during pregnancy is an important cause of morbidity and mortality accounting for 20% of total maternal deaths in India.<sup>3</sup> In fact, India has the highest

prevalence of anemia of about 70% among pregnant women. Though Punjab is known as a prosperous state of India but the status of anaemia among antenatal women is equally alarming as revealed by the NFHS-4 (2015-16) where anaemia prevalence was found to be 42%. Situation is graver in rural (46.5%) as compared to urban (34.7%) areas.<sup>4</sup>

Various interventions are aimed at prevention of iron deficiency and iron deficiency anaemia in pregnancy like iron supplementation, food fortification with iron, health and nutrition related education, control of parasitic infections, and improvement in environmental sanitation. Daily oral iron and folic acid supplementation has been recommended as part of the routine antenatal care to decrease the risk of low birth weight, maternal anaemia and iron deficiency.<sup>5</sup>

In view of its public health importance, Government of India had recommended 100 tablets of iron folic acid (IFA) tablets (each containing 100 mg of elemental iron and 500 micrograms of folic acid) as an intervention under the RCH-II Programme.<sup>6</sup> However, the program has not had anticipated success till date as evident from the fact that only 30.3% of women consumed IFA tablets for 100 days or more when they were pregnant whereas in Punjab 42.6% received for the same duration.<sup>4</sup>

It is important to highlight the fact that the effectiveness and success of such interventions depends on the compliance of IFA tablets. Compliance describes the degree to which a patient correctly follows a medical advice. Many experts reiterate that one of the key reasons that national iron supplementation initiatives have failed is women's "noncompliance".<sup>7</sup> Health education thus forms an integral part and one of the essential components of all national health programmes and primary health care in India.<sup>8</sup> One to one health education of pregnant women can be a useful tool for effective utilization of MCH services like improvement in consumption and compliance of IFA tablets.

Various studies have been conducted in different parts of the country to assess the availability and level of utilisation of IFA but the positive outcomes of health education as an intervention tool had not been well studied especially in this region and hence needed further research. With this preamble, this study was conducted to assess the problem of Anaemia among pregnant women as well as to study the compliance and utilization of IFA tablets before and after the health education intervention.

## METHODS

It was a cross-sectional interventional study conducted at Village Naagkalan which was the field practice area of Department of Community Medicine, GMC, Amritsar, Punjab. Duration of the study was one year (April 2014 to March 2015). All pregnant women in the village in the second trimester who were to deliver in the study year

were identified with the help of ASHA and written informed consent was then taken. They were interviewed using a pre-designed and pre-tested questionnaire regarding socio-demographic profile, ANC care and other relevant information.

Two visits were made to all the antenatal women included in the study. During the first visit, baseline data was recorded and they were enquired about consumption of IFA tablets. Haemoglobin levels were measured. One to one health education (intervention) regarding dosage, timing, benefits and possible side effects of IFA supplementation was then imparted to all women through a pamphlet designed in vernacular language. In the 2nd visit (after 3 months), a repeat Hb measurement was taken and the impact of this intervention was evaluated by checking the adherence and compliance to IFA tablets. Haemoglobin estimation was done by Sahli's method and anaemia in pregnancy was classified according to WHO criteria.<sup>9</sup>

## Statistical analysis

The collected data was compiled, tabulated and analyzed using SPSS software. Descriptive statistics were computed with percentages, mean and standard deviation (S.D). Appropriate statistical tests like Chi-square, Fisher's exact test and paired t test were used as applicable for finding the associations.

## RESULTS

A total of 111 pregnant women were enrolled in the study and were followed for a period of 6 months.

### Socio-demographic profile

Majority 87.39% of pregnant mothers were 18-29 years old. 22.52% of pregnant mothers were illiterate. Most i.e., 71.17% of the pregnant women belonged to upper lower class according to modified Kuppuswamy scale of socio-economic status. The mean age of marriage amongst pregnant women was 21.02±2.67 years while the mean age at first pregnancy was 22.33±2.73 years.

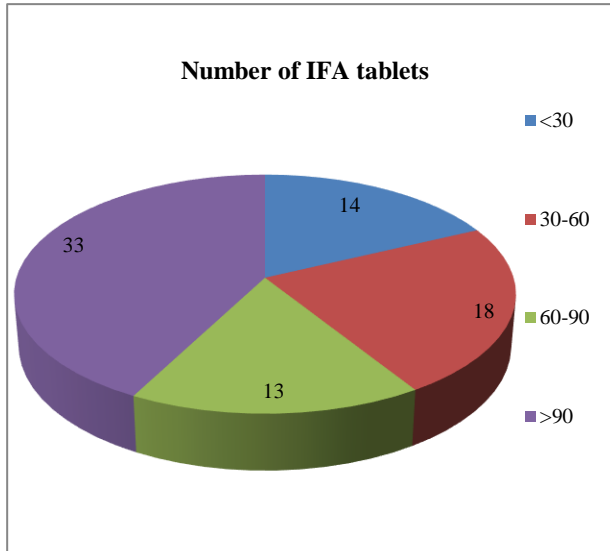
**Table 1: Distribution of pregnant women on the basis of starting IFA tablets before and after intervention<sup>@</sup> (n=111).**

IFA started	Pre-intervention		Post-intervention	
	N	%	N	%
Yes	31	27.93	92	82.88
No	80	72.07	19	17.12
<b>Total</b>	<b>111</b>	<b>100.00</b>	<b>111</b>	<b>100.00</b>

<sup>@</sup>intervention included ensuring that 100% pregnant women received (or bought) 100 tablets of IFA and consume it.

Regarding the initiation of IFA supplementation, it was revealed that only 27.93% pregnant women had started taking IFA tablets before intervention while after

intervention, majority i.e., 92 (82.88%) started taking IFA, shown in Table 1. However, 19 (17.12%) women did not start IFA even after intervention. The reasons for not starting IFA included- 'didn't feel the need to take IFA' in 10 (52.64%), fear in 8 (42.10%) and 'taken during last pregnancy' in 1 (5.26%) pregnant women.



**Figure 1: Distribution of pregnant women on the basis of IFA tablets consumption after the intervention (n=78).**

Figure 1 showed that after intervention, out of 78 pregnant women who consumed iron in the form of IFA tablets, most i.e., 33 (42.31%) consumed more than 90 tablets, 16.67% had 60-90 tablets, 23.08% had 30-60 while 17.95% had consumed less than 30 IFA tablets. Remaining 14 antenatal women (15.22%) took other forms of Iron preparations like syrups or iron injections.

**Table 2: Distribution of pregnant women according to the reasons given for consuming IFA tablets for less than 90 days.**

Reasons	No. of pregnant women	Percentage
Side effects	23	51.11
Bad taste	9	20.0
Forgot to take	7	15.56
Others	6	13.33
<b>Total</b>	<b>45</b>	<b>100.0</b>

Table 2 showed out of total 45 pregnant women who had consumed IFA tablets for less than 90 days, most common reasons cited were side effects in 23 (51.11%), bad taste in 9 (20.0%) 7 (15.56%) women forgot to take and 6 (13.33%) women reported 'other' reasons like 'bad smell', 'gone to parents house' and 'difficulty in swallowing tablet' etc.

Regarding the side effects due to intake of iron preparations during pregnancy, majority i.e., 65 (70.65%) did not complain of any side effects. Table 3 shows, amongst those having side effects (29.35%), vomiting was the most common side effect 7.61%, followed by gastritis and constipation in 6.52% each and nausea and general discomfort in 3.26% each.

**Table 3: Distribution of pregnant women on the basis of side effects due to intake of iron preparations during pregnancy (n=92).**

Side effects	No. of pregnant women	Percentage
None	65	70.65
Vomiting	7	7.61
Gastritis	6	6.52
Constipation	6	6.52
Nausea	3	3.26
General discomfort	3	3.26
Abdominal pain	1	1.09
Any other	1	1.09
<b>Total</b>	<b>92</b>	<b>100.0</b>

A very high prevalence of anemia (96.4%) among pregnant woman was observed before the intervention. More than half i.e., 57 (51.4%) had moderate anemia, 47 (42.3%) had mild anemia, 3 (2.7%) had severe anemia while only 4 (3.6%) women had Hb in the normal range. Although prevalence of anemia was found to be slightly higher among those below 25 years of age, but the difference was not statistically significant, as also between the religions.

Moderate and severe anemia cases were more common in women who were educated less than middle class (59.2% and 4.2% respectively) as compared to those educated above middle school (37.5% and 0% respectively). Similarly, those antenatal women belonging to lower socio economic status suffered more from moderate (61.4%) to severe anemia (3.6%) in comparison to higher economic group (21.4% and 0% respectively) and this was found to be statistically significant as shown in Table 4.

Coming to the obstetric profile, it was further observed that out of those having normal Hb levels, majority i.e., three-fourths (75.0%) were gravida one. More than two thirds i.e., 66.67% of severe anemia cases were found in pregnant women having 4 or more pregnancies. The difference was found to be statistically significant. (p<0.01). Also, as shown in Table 4, the study found slightly higher prevalence of anaemia among those pregnant woman whose age at first pregnancy was below 22 years (97.2%) and those with history of one or more abortions in the past (100.0%). However, this difference was not found to be statistically significant.

**Table 4: Distribution of grade of anemia according to socio-demographic and obstetrical characteristics (n=111).**

Characteristic	Grade of anemia				Total	P value
	Normal	Mild	Moderate	Severe		
	N (%)	N (%)	N (%)	N (%)		
<b>Age (years)</b>						0.15
≤25	2 (2.6)	29 (38.2)	44 (57.9)	1 (1.3)	76 (100.0)	
>25	2 (5.7)	18 (51.4)	13 (37.1)	2 (5.7)	35 (100.0)	
<b>Religion</b>						0.29
Hindu	1 (25.0)	2 (50.0)	1 (25.0)	0 (0.0)	4 (100.0)	
Sikh	2 (2.5)	35 (43.2)	41 (50.6)	3 (3.7)	81 (100.0)	
Christian	1 (3.8)	10 (38.5)	15 (57.7)	0 (0.0)	26 (100.0)	
<b>Education</b>						0.02*
Upto middle class	1 (1.4)	25 (35.2)	42 (59.2)	3 (4.2)	71 (100.0)	
Above middle class	3 (7.5)	22 (55.0)	15 (37.5)	0 (0.0)	40 (100.0)	
<b>Type of family</b>						0.01*
Nuclear	1 (4.8)	13 (61.9)	5 (23.8)	2 (9.5)	21 (100.0)	
Joint	3 (3.3)	34 (37.8)	52 (57.8)	1 (1.1)	90 (100.0)	
<b>Socio-economic status<sup>#</sup></b>						0.00*
Lower	1 (1.2)	28 (33.7)	51 (61.4)	3 (3.6)	83 (100.0)	
Middle	3 (10.7)	19 (67.9)	6 (21.4)	0 (0.0)	28 (100.0)	
<b>Age of first pregnancy (years)</b>						0.11
≤22	2 (2.8)	25 (34.7)	43 (59.7)	2 (2.8)	72 (100.0)	
>22	2 (5.1)	22 (56.4)	14 (35.9)	1 (2.6)	39 (100.0)	
<b>Number of pregnancies</b>						0.001*
1	3 (6.0)	21 (42.0)	26 (52.0)	0 (0.0)	50 (100.0)	
2	0 (0.0)	15 (37.5)	24 (60.0)	1 (2.5)	40 (100.0)	
3	1 (6.7)	9 (60.0)	5 (33.3)	0 (0.0)	15 (100.0)	
4 and above	0 (0.0)	2 (33.33)	2 (33.33)	2 (33.33)	6 (100.0)	
<b>No. of abortions</b>						0.13
0	4 (4.2)	40 (41.7)	51 (53.1)	1 (1.0)	96 (100.0)	
1	0 (0.0)	6 (46.2)	5 (38.5)	2 (15.4)	13 (100.0)	
2 and above	0 (0.0)	1 (50.0)	1 (50.0)	0 (0.0)	2 (100.0)	

\*- significant at p<0.05; #- There was no respondent from upper class.

**Table 5: Distribution of pregnant women according to Hemoglobin levels before and after intervention (n=111).**

Hb level (g/dl)	Pre-intervention		Post-intervention	
	No.	Percentage	No.	Percentage
Normal range	4	3.60	8	7.33
Mild anemia	47	42.34	33	30.28
Moderate anemia	57	51.35	67	61.47
Severe anemia	3	2.70	1	0.92
<b>Total</b>	<b>111</b>	<b>100.00</b>	<b>109<sup>#</sup></b>	<b>100.00</b>

#- 2 pregnant women delivered during the follow-up period

Table 5 demonstrates the effect of intervention on the degree of anemia where after intervention, the proportion of moderate anemia cases substantially increased from 57 (51.35%) to 67 (61.47%) and women with normal Hb slightly raised from 4 (3.6%) to 8 (7.33%) while cases of

mild anemia reduced from 47 (42.34%) to 33 (30.28%) and severe anemia cases reduced from 3 (2.7%) to only 1 (0.92%).

**Table 6: Mean hemoglobin change by the intervention (health education).**

Mean Hb and standard deviation before intervention (gm%)	9.19±1.05
Mean Hb and standard deviation after intervention (gm%)	8.94±1.02
Paired difference mean and standard deviation	0.248±1.03
Standard error mean	0.099
t value	2.514
df	108
Significance	0.013

Table 6 shows the overall prevalence of anemia before intervention was found to be 96.4% which reduced slightly to 92.67% after intervention. The mean Hb before intervention was found to be 9.19±1.05 while it became

8.94±1.02 after intervention of IFA. This decrease in the mean Haemoglobin values (0.248) of these pregnant women was found to be statistically significant ( $t=2.514$ ,  $p=0.013$ ).

## DISCUSSION

The magnitude of anemia as estimated in the present study was very high (96.4%) in contrast to the study conducted by Padda et al (84.5%) and DLHS-4 where 59.8% of pregnant women had anemia.<sup>10,11</sup> This could be as a result of poor nutritional status due to lower socioeconomic class and less purchasing power of the study population. Also, the present study revealed the predominance of moderate anemia (51.35%) similar to findings of Gautam where moderate anemia was found to be more prevalent (50.9%).<sup>12</sup>

As in other studies, anaemia was found to be inversely related to educational and socio-economic status of antenatal women.<sup>13,14</sup> Also, in the current study, it was observed that prevalence and severity of anemia increased as gravidity increased which is similar to the study by Bisoi.<sup>15</sup> These factors are amenable to timely health education to adolescent girls regarding importance of literacy, delaying the age at marriage, family spacing, small family norm etc.

According to the present study, the impact of the intervention can be clearly seen as evident by the fact that majority 82.88% of pregnant women were put on IFA supplementation. Further, at least half of the women (42.31%) consumed IFA tablets for 90 or more days. This is much better than findings of DLHS-4 (2012-2013) survey where only 25.3% and Ansari et al study in rural Aligarh where only 7.6% women had consumed IFA for 90 days or more.<sup>10,16</sup> The reasons of the better IFA compliance in the present study could be positive impact of the health education (intervention) of pregnant women on beneficial effect of intake of at least 100 tablets through regular house visits and constant motivation.

Another appreciable finding in present study was that only 29.34% antenatal women complained of any side effects after IFA intake as against Gautam et al study where a high proportion of pregnant women (43.4%) suffered from side effects of IFA like nausea, vomiting and diarrhea.<sup>12</sup> The possible reasons of fewer incidences of side effects in study population could be due to correct advice given to the women during the intervention regarding appropriate timing or schedule of IFA tablets. This resulted in overall better adherence and compliance to the IFA regimen. However, it is imperative to note that there was no improvement in the Hb levels of these women; rather there was a decline in the Hb levels even after supplementation with iron-folic acid. This is congruent to another study by Sarkar et al which also revealed that following IFA supplementation, the proportion of women with moderate anemia had increased from 15.4% to 24.6% and the decrease in the

mean Hb levels in these women was statistically significant which is similar to present study.<sup>17</sup> One biological reason of lower hemoglobin concentrations even after IFA supplementation could be as a result of haemodilution that occurs physiologically during pregnancy. Another reason could be that the dose of IFA given to the pregnant women i.e. 1 tablet daily for 100 days was only for prophylaxis and thus may have been insufficient to increase their Hb levels since majority were already suffering from anemia at the beginning of the study. Other possible reasons may be high prevalence of infections like hookworm infestation and malaria, poverty, ignorance, poor iron in diet, food taboos, faulty cooking, repeated and close child birth and other socio-cultural factors like unequal distribution of food in joint family and tradition of eating last by females.

## CONCLUSION

Anemia during pregnancy continues to be a formidable problem. Thus, it is apt to initiate a community based educational campaign to increase awareness regarding beneficial effects of IFA and dispel the various myths and misconceptions. In our study, positive impact of health education intervention was reflected by the fact that around 82.88% of pregnant women were put on IFA supplementation; out of which 42.31% consumed more than 90 tablets. Although the overall prevalence of anemia reduced slightly from 96.4% to 92.67% after intervention, the mean Hb levels got decreased. Hence, more randomized controlled trials are needed to clarify the real impact of prophylactic IFA supplementation during pregnancy, especially in developing countries, taking into account the culture, geography, social and economic status, lifestyle, nutritional status, and all issues that determine health conditions in pregnancy and infancy.

## Recommendations

There is a need for training and retraining of various health functionaries in order to educate mothers about IFA supplementation particularly through regular home visits. Awareness should also be generated among the community through various methods of communication which can help to combat anemia. Counselling of expectant mothers is particularly of paramount importance, even before starting IFA in order to improve the compliance and adherence rates.

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